IN THE CLAIMS

Please substitute the following listing of claims for the previous listing of claims.

1. (currently amended) A method of processing a substrate, the method comprising:

providing a substrate in a process chamber, the substrate having a surface;

introducing a gas into the process chamber;

energizing the gas by passing RF energy through a wall of the process chamber at a power sufficient to couple the RF energy from above an external surface of the process chamber to the gas inside the process chamber to energize the gas; ~~and~~

detecting optical radiation from directly above the surface of the substrate after the radiation propagates through the wall and the external surface of the process chamber; and

evaluating the detected optical radiation to monitor the depth of a layer being processed on the substrate.

2. (previously presented) A method according to claim 1 comprising energizing the gas by powering an antenna external to the process chamber at the power.

3. (previously presented) A method according to claim 2 wherein the antenna (1) covers a portion of a ceiling of the process chamber, (2) is non-vertical, or (3) comprises a coil.

4. (previously presented) A method according to claim 2 wherein the antenna covers a portion of a ceiling of the process chamber, and wherein the ceiling (1) is at least partially dome shaped, (2) comprises a ceramic, or (3) comprises a portion that is permeable to RF energy.

5. (previously presented) A method according to claim 1 wherein the radiation propagating through the wall comprises an optical beam.

6. (previously presented) A method according to claim 1 wherein the wall comprises a window that (1) faces the substrate, (2) is permeable to X-rays, (3) is permeable to an optical beam, (4) comprises one or more of silica, sapphire or quartz, (5) is removable from the wall, or (6) is permanently affixed about an opening in the wall.

7. (original) A method according to claim 1 comprising monitoring radiation propagating through the wall with a process monitoring assembly, and wherein the process monitoring assembly (1) is housed in an enclosure above the wall, (2) is adapted to be mounted above a window in the wall, (3) is mounted to allow line-of-sight view of the substrate in the process chamber, (4) is responsive to optical radiation, or (5) comprises an interferometer.

8. (original) A method according to claim 1 comprising monitoring radiation propagating through the wall with a process monitoring assembly comprising a signal source, a signal detector, a collimating assembly and a radiation transmission cable connecting the collimating assembly to the signal source and signal detector, the radiation transmission cable having a bifurcated end.

9. (original) A method according to claim 8 comprising connecting a first branch of the bifurcated end to the signal source and a second branch of the bifurcated end to the signal detector.

10. (currently amended) A method of processing a substrate, the method comprising:

placing a substrate in a process chamber, the substrate having a surface;

introducing a gas into the process chamber;

inductively coupling RF energy through a portion of the ceiling of the process chamber facing the substrate at a power sufficient to couple the RF energy from above an external surface of the portion of the ceiling facing the substrate to the gas inside the process chamber to energize the gas; ~~and~~

detecting optical radiation from directly above the surface of the substrate after the radiation propagates through a window in the portion of the ceiling facing the substrate and the external surface of the process chamber; and

evaluating the detected optical radiation to monitor the depth of a layer being processed on the substrate.

11. (cancelled)

12. (previously presented) A method according to claim 10 comprising inductively coupling the RF energy by powering an antenna that (1) is non-vertical, or (2) comprises a coil.

13. (previously presented) A method according to claim 10 wherein the portion of the ceiling substantially facing the substrate (1) is at least partially dome shaped, (2) comprises a ceramic, or (3) comprises a portion that is permeable to RF energy.

14. (previously presented) A method according to claim 10 comprising monitoring radiation comprising an optical beam propagating through the window.

15. (previously presented) A method according to claim 10 wherein the window (1) faces the substrate, (2) is permeable to X-rays, (3) is permeable to an optical beam, (4) comprises one or more of silica, sapphire or quartz, (5) is removable from the wall, or (6) is permanently affixed about an opening in the wall.

16. (previously presented) A method according to claim 10 comprising detecting radiation with a process monitoring assembly, wherein the process monitoring assembly (1) is housed in an enclosure above the portion of the ceiling facing the substrate, (2) is adapted to be mounted above the window, (3) is mounted to allow line-of-sight view of the substrate in the process chamber, (4) is responsive to optical radiation, or (5) comprises an interferometer.

17. (currently amended) A method of processing a substrate, the method comprising:

providing a chamber having a wall, the wall comprising an external surface that is at least partially dome shaped;

providing a substrate in the chamber, the substrate having a surface;

introducing a gas into the chamber;

inductively coupling RF energy at a power sufficient to pass the RF energy from above the at least partially domed external surface to the gas inside the chamber; ~~and~~

monitoring optical radiation from directly above a surface of the substrate that propagates through the at least partially domed external surface during processing of the substrate; and

evaluating the detected optical radiation to monitor the depth of a layer being processed on the substrate.

18. (previously presented) A method according to claim 17 comprising monitoring radiation that propagates through a window in the wall.

19. (previously presented) A method according to claim 17 comprising powering an antenna covering a portion of the wall of the chamber to couple energy to process gas in the chamber.

20. (previously presented) A method according to claim 17 comprising monitoring radiation comprising an optical beam propagating through the window.

21. (currently amended) A method of processing a substrate, the method comprising:

placing a substrate in a first enclosure, the substrate having a surface;

introducing a process gas into the first enclosure;

powering an antenna to inductively couple RF energy at a power sufficient to pass RF energy from outside an external surface of a portion of the ceiling of the first enclosure facing the substrate to the process gas inside the first enclosure to energize the process gas; and

monitoring a sufficient intensity of <u>optical</u> radiation from directly above the surface of the substrate from after the radiation has propagated through the portion of the ceiling and external surface of the first enclosure facing the substrate and into a second enclosure disposed above the first enclosure to <u>monitor the depth of a layer being processed on the substrate to</u> determine a process endpoint.

22. (original) A method according to claim 21 wherein the antenna is within the second enclosure.

23. (cancelled)

24. (previously presented) A method according to claim 21 comprising monitoring radiation with a process monitoring assembly at least partially within the second enclosure, the process monitoring system comprising a signal source, a signal detector, a collimating assembly and a radiation transmission cable connecting the collimating assembly to the signal source and signal detector, the radiation transmission cable having a bifurcated end.

25. (original) A method according to claim 24 comprising connecting a first branch of the bifurcated end to the signal source and a second branch of the bifurcated end to the signal detector.

26. (withdrawn) A substrate processing apparatus comprising:
a process chamber and
a process monitoring assembly comprising a signal source, a signal detector, a collimating assembly and a radiation transmission cable connecting the collimating assembly to the signal source and signal detector, the radiation transmission cable having a bifurcated end.

27. (withdrawn) An apparatus according to claim 26 wherein the radiation transmission cable is a fiber optic cable.

28. (withdrawn) An apparatus according to claim 26 wherein the transmission cable comprises a first branch connected to the signal source and a second branch connected to the signal detector.

29. (withdrawn) An apparatus according to claim 26 comprising a first enclosure to energize process gas and a second enclosure at least partially enclosing the process monitoring assembly.

30. (withdrawn) A substrate processing apparatus comprising:

a process chamber comprising a wall, wherein the wall comprises a ceiling portion comprising an external surface;

an antenna at least partially covering the external surface of the ceiling portion; and

a process monitoring assembly responsive to radiation that propagates through the wall during processing of the substrate.

31. (withdrawn) An apparatus according to claim 30 wherein the wall comprises a window.

32. (withdrawn) An apparatus according to claim 30 wherein the window is in the ceiling portion.

33. (currently amended) A method of processing a substrate in a process chamber having a wall and a non-vertical antenna about the wall, the method comprising:

placing a substrate in the process chamber;

introducing a gas into the process chamber;

powering the non-vertical antenna that is to couple energy through the wall to the gas inside the process chamber to energize the gas; ~~and~~

detecting <u>optical</u> radiation propagating through the wall<u>; and</u>

<u>evaluating the detected optical radiation to monitor the depth of a layer being processed on the substrate</u>.

34. (currently amended) A method according to claim 33 comprising powering a non-vertical antenna that is a coil.

35. (previously presented) A method according to claim 33 comprising detecting radiation propagating through a wall comprising a ceramic.

36. (previously presented) A method according to claim 35 wherein the ceramic comprises alumina or silica.

37. (previously presented) A method according to claim 33 comprising detecting radiation comprising an optical beam.

38. (currently amended) A method of processing a substrate in a chamber having an external top surface, and an antenna covering at least a portion of the external top surface, the method comprising:

providing a substrate in the chamber:

introducing a gas into the chamber;

coupling energy across the substantial portion of the external top surface to the gas in the chamber by powering the antenna; and

monitoring optical radiation that propagates through the portion of the external top surface; and

evaluating the detected optical radiation to monitor the depth of a layer being processed on the substrate.

39. (previously presented) A method according to claim 38 comprising powering an antenna that is non-vertical.

40. (previously presented) A method according to claim 38 comprising detecting radiation comprising an optical beam.

41. (currently amended) A method of processing a substrate in a chamber comprising a flat wall facing the substrate and an antenna at least partially covering the flat wall; method comprising:

providing a substrate in the chamber:

introducing a gas into the chamber;

coupling energy across the wall to the gas in the chamber by powering the antenna; ~~and~~

detecting optical radiation that propagates through the flat wall; and

evaluating the detected optical radiation to monitor the depth of a layer being processed on the substrate.

42. (previously presented) A method according to claim 41 comprising powering an antenna that is a coil.

43. (previously presented) A method according to claim 41 comprising detecting radiation comprising an optical beam.

44. (currently amended) A method of processing a substrate in a chamber comprising a wall facing the substrate, a cathode within the chamber, and an RF power source, the method comprising:

providing a substrate in the chamber:

introducing a gas into the chamber;

applying an RF signal to the cathode by powering the RF power source to produce electric fields within the chamber that interact with the gas to form a plasma in the chamber;~~-and~~

detecting optical radiation that propagates through the wall; and

evaluating the detected optical radiation to monitor the depth of a layer being processed on the substrate.

45. (previously presented) A method according to claim 44 comprising detecting radiation comprising an optical beam.

46. (withdrawn) A substrate processing apparatus comprising:

(a) a chamber to process a substrate, the chamber comprising a substantially flat wall facing the substrate;

(b) an antenna at least partially covering the substantially flat wall; and

(c) a process monitoring assembly to detect radiation that propagates through the substantially flat wall.

47. (withdrawn) An apparatus according to claim 46 wherein the antenna is a coil.

48. (withdrawn) An apparatus according to claim 46 wherein the substantially flat wall comprises a ceramic.

49. (withdrawn) An apparatus according to claim 46 wherein the ceramic comprises one or more of alumina or silica.

50. (withdrawn) A substrate processing apparatus comprising:

(a) a chamber to process a substrate, the chamber comprising a wall facing the substrate;

(b) a gas inlet to provide a gas in the chamber;

(c) an RF power source to couple RF energy from the wall to the gas;

(d) a process monitoring assembly to detect radiation that propagates through the wall.

51. (withdrawn) An apparatus according to claim 50 wherein the wall is facing the substrate.

52. (withdrawn) An apparatus according to claim 50 wherein the wall is substantially flat.

53. (withdrawn) An apparatus according to claim 50 wherein the RF power source powers an antenna about the wall.

54. (withdrawn) An apparatus according to claim 50 wherein the wall comprises a ceramic.

55. (withdrawn) An apparatus according to claim 50 wherein the ceramic comprises one or more of alumina or silica.